

dualism, relating to some one subject, orderly and carefully laid down in words, comprehending the doctrine, reason, and theory of the thing, without any immediate application thereof to the object of life. Thus, natural philosophy, ethics, logic, pure mathematics, statics, &c., are sciences. An *art* is not founded on self-evident principles or demonstrations, but is a system or collection of rules, precepts, inventions, or experiments, which being duly observed, make the things a man undertakes succeed, and render them advantageous and agreeable. Thus, grammar, painting, poetry, sculpture, music, anatomy, dancing, &c., are arts.

The difference between the two may be illustrated by that between wit and humour: the former is a general faculty of exciting agreeable and surprising pictures in the imagination; and the latter a particular one: the former is pure and absolute in its kind, the latter tinged with something foreign and complexional. In this sense an art and a science only seem to differ as law and more pure; and my parallel becomes more like that species of mathematical lines, which continue to draw nearer and nearer to each other, infinitely, yet never coincide; for a science is a system of deductions, made by reason alone, undetermined by any thing foreign or extrinsic to itself. An art, on the contrary, requires a number of data and postulates to be furnished from without; and never goes any length, without, at every turn, needing new ones. Nevertheless, an art appears to be a portion of science or general knowledge; considered, not in itself, as a science, but with relation to its circumstances or appendages. In a science, the mind looks directly backwards and forwards to the premises and conclusions: in an art we look laterally to the concomitant circumstances. A science, in fact, is to an art, what a stream running in a direct channel, without regard to any thing but its own progress, is to the same stream turned out of its proper course, and disposed into cascades, fairs, estuaries, ponds, &c., in which case the progress of the stream is not considered in regard to itself, but only as it concerns the works, every one of which modifies the course of the stream and leads it out of its way. It is easy to trace the course of the former from its rise to its issue, as it flows consecutively; but a man, ever so well acquainted with this, will not be able to discern that of the latter, as it depends on the genius, humour, and caprice of the engineer who laid the design.

The arts which relate to the sight and hearing, Bacon observes, "are reputed liberal beyond those which regard the other senses, which are chiefly employed in matters of luxury." The mechanical arts are generally practised by means of a machine, and require more the assistance of the hand and body than the mind. However, there is no truth more undeniable than this, that if man were not really and truly a free agent, there would be no such thing as an art, at least in the sense here understood: but art would only be a name given to that system or series of effects to which man is made by nature, and in her hands, subservient; and might, with equal reason, be attributed to such effects as any other natural production is subservient to. But we must not forget those origination theories, visionary speculations, and chimerical inventions, which are never matured into either an art or a science; their covetous office please, but with novelty they pass away, and now gone succeed, "like leaves of trees, though not by a similar order of nature, but because things that become useless soon become contemptible."

Among the scientific vagaries of the present time, we have phrenology, mesmerism, mediumism, clairvoyance, the homeopathic system, and some others: to say the least of them, they are more adapted to catch and entangle the mind, than to instruct and inform the understanding; and, perhaps, without naming the most of them, the words formerly applied to *acknyms* would do very well of them. "It is an art without error, the beginning of which is decent, its middle labour, and its end beggary." But when error has obtained the mastery of our minds during our tender age, we are seldom at pains to shake off its yoke, but rather strive to subject ourselves

Again, when we hear of a young person knowing a great many sciences and arts, we suspect him of understanding them very imperfectly, or of knowing only the elements at most, which is in fact knowing nothing at all. Some, it is true, have a passion for universal knowledge, and this universal knowledge consists in knowing by memory a few words upon every subject, which convey no kind of ideas. To those that would form a new science, or extend the boundaries of the old, we would suggest the following rules, which are strictly observed by mathematicians:—

1. To offer nothing but what is couched in clear express terms; and to that end, to begin with definitions.
2. To build only on evident and clear principles: hence it is necessary to proceed only from axioms or maxims.
3. To prove demonstratively all the conclusions that are drawn hence; and for this purpose, to make use of so arguments or proofs, but definitions already laid down. This is easily granted, and propositions need no proof, which serve as principles to things that follow.

#### ENERGIATYPY.

A NEW PHOTOGRAPHIC PROCESS.  
(From the *Illustrated*.)

While pursuing some investigations, with a view to determine the influence of solar rays upon precipitation, I have been led to the discovery of a new photographic agent, which can be employed in the preparation of paper with a facility which no other sensitive process possesses. Being desirous of affording all the information I possibly can to those who are anxious to avail themselves of the advantages offered by photography, I solicit a little space in your columns for the purpose of publishing the particulars of this new process. All the photographic processes with which we are at present acquainted, sufficiently sensitive for the fixation of the images of the camera obscura, require the most careful and precise manipulation; consequently, those who are not accustomed to the niceties of experimental pursuits are frequently annoyed by failures. The following statement will at once show the exceeding simplicity of the new discovery.

Good letter-paper is first washed over with the following solution:—

A saturated solution of succinic acid 2 drachms.  
Mucilage of gum arabic " " " "  
Water " " " " " "

When the paper is dry, it is washed over once with a neutral solution containing one grain of nitrate of silver to one ounce of distilled water. The paper is allowed to dry in the dark, and it is fit for use; it can be preserved in a portfolio, and at any time employed in the camera. This paper is a pure white, and it retains its colour, which is a great advantage. At present, I find it necessary to expose the sensitized paper in the camera for periods, varying with the quantity of sunshine, from two to eight minutes, although from some results which I have obtained, I am satisfied that by a nice adjustment of the proportions of the materials, a much shorter exposure will suffice. When the paper is removed from the camera, no trace of a picture is visible. We have then to mix together one drachm of a saturated solution of sulphate of iron, and two or three drachms of the mucilage of gum arabic. A wide flat brush saturated with this solution is now swept over the face of the paper rapidly and evenly. In a few seconds, the dormant images are seen to develop themselves, and with great rapidity a pleasing negative photographic picture is produced. The first solution is to be washed off as soon as the best effect appears, this being done with a soft sponge and clean water. The drawing is then soaked for a short time in water, and may be permanently fixed, by being washed over with ammonia;—or perhaps better with a solution of the hyposulphite of soda, care being taken that the salt is afterwards washed out of the paper. From the pictures thus produced, any number of others, correct in position and in light and shadow, may be produced, by using the same sensitized paper in the ordinary way; from five to ten minutes in sunshine producing the desired

The advantages which this process possesses over every other must be, I think, apparent. The papers are prepared in the most simple manner, and may be kept ready by the tourist until required for use; they require no preparation previously to their being placed in the camera, and they can be preserved until a convenient opportunity offers for bringing out the picture, which is done in the most simple manner, with a material which can be anywhere procured.

Amos to give the public the advantage of this process during the beautiful weather of the present season, I have not waited to perfect the manipulatory details which are necessary for the production of portraits. It is sufficient, however, to say, that experiment has satisfied me of its applicability for this purpose.

Prismatic examination has proved that the rays effecting this chemical change are those which I have elsewhere shown to be perfectly independent of solar light or heat. I therefore propose to distinguish the process by a name which has a general rather than a particular application. Regarding all photographic phenomena as due to the principle *Enactio*, I would nevertheless wish to distinguish this very interesting process as the *Enactiotype*.

I enclose you a few specimens of the results already obtained. The exceeding sensibility of the *Enactiotype* is first shown by an attempt to copy an engraving or letter by it. The three specimens I enclose were produced by an exposure of considerably less than one second.

ROBERT HUNT.

Falmouth, May 27, 1844.

#### OPEN GRATES AND STOVES.

Few circumstances, perhaps, have tended so much, in modern times, to alter the state of health, as effected by the internal arrangements of dwelling-houses, as the great reduction in the altitude of the chimney-pieces, and the more skilful disposition of the fire-place for the economy of fuel. The practical consequence has been, that a less amount of air is necessarily forced through individual apartments, when the coldness of the weather renders it necessary to keep the windows shut; and, above all, that the air which does pass to the fire, is, in general, below the level of the head, and exercises, accordingly, little or no purifying influence upon that portion of the atmosphere which is within the zone of respiration. The cottage grate, so very generally introduced of late years, is extremely comfortable, from the low position of the fuel, the comparative absence of draught, and the powerful radiating influence of the fire-brick on the back and sides; but the smaller the apartment, and the more perfect its construction, the less must it alone be trusted to in securing ventilation. A common fire heats an apartment, in general, almost solely by radiation, excepting the influence of the fire upon the wall. In some cases, fire-places have been constructed as to parts, admitting of the elevation of the flues. The peculiar advantages of a fire-place are not merely its power of warming an apartment, the circulation of air which it induces, its accessibility, and the influence of the light which it evolves; but the very grateful effect which it produces after the body has been chilled by any special cause, whether in doors or out of doors, stimulating it, the exertion of the circulation to the greatest degree which may be considered agreeable, and permitting each individual to adjust the distance which is most suitable to his own constitution, and the previous exposure to which he may have been more immediately subject. The light, also, is not to be considered a mere nominal advantage, but a real and positive benefit, effecting the whole system by its physical action, independently of the cheerful impression which its liveliness is calculated to excite, and which, to many, is so engaging, that they feel as if they were not alone when they have the company of a glowing fire. These considerations will probably always sustain the open fire-place, in countries where fuel can be procured with sufficient economy; but in this district, in other respects, compared with the others, are marked, particularly its expense, its local nature, the dust it is apt to produce, and the frequent attendance which it requires.—Read on